

Case Report

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Left Bronchial Foreign Body Is Always Left Rigid Bronchoscopy an Armour Beyond Barriers in Retrieval-A Case Series

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Abstract

Airway foreign bodies (AFBs) is an interdisciplinary area between, Pediatrics and Otolaryngology [1]. Foreign-body aspiration in the airway of children is a life-threatening clinical situation responsible for many deaths each year. Most airway foreign body aspirations occur in children younger than 15 years; children aged 1-3 years are the most susceptible [2]. Vegetable matter tends to be the most common airway foreign body; peanuts are the most common food item aspirated [5]. We present four interesting cases of bronchial foreign bodies that caused diagnostic and therapeutic challenges.

Key Words: Foreign body (FB), Aspiration, Bronchus, Rigid Bronchoscopy

Introduction

Foreign bodies in the upper aerodigestive tract can be a therapeutic and diagnostic challenge and can be fatal if diagnosis is delayed because of early or late complications [4]. The clinical course and outcome of inhaled FB largely depends on the nature/type of the FB, the arrest or impaction site along the tracheobronchial tree and potentially the availability of skilled Assistant. FBs can become impacted at any site from the inlet of the larynx to the terminal bronchioles; but FBs most often become lodged in the right main bronchus in line with the trachea as it is shorter, wider, less angulated thereby creating a relatively straight pathway from the larynx to the bronchus [6]. Aspiration of FB often presents with an initial history of a choking episode and coughing followed by respiratory symptoms which may cause either acute airway obstruction and death or chronic sequelae such as repeated pulmonary infections, atelectasis, and bronchiectasis. Although proper history and examination are important to determine children who need investigation and removal of FBs. We present four prototypic cases of bronchial foreign bodies which are in different age group, different nature.

Case – One

A 12year old school going boy was admitted in our department with one-day history of, accidental swallowing of the foreign body (metal screw) while talking to his friends with keeping the FB inside the mouth. He was complaining of right side chest pain, cough. No history of throat pain, odynophagia, dysphagia, dyspnea, vomiting. He could talk and swallow well. On general examination patient is comfortable, no respiratory distress with stable vitals. Examination of Respiratory system revealed decreased breath sound in the right lung field. An posteroanterior view of the chest X Ray shows a radio opaque foreign body in the right main

bronchus with significant collapse of the right middle and lower lobe forming right paracardial opacity (Fig 1). There is a compensatory hyperinflation of the right upper lobe with subtle haziness in the right lung inferiorly and left lung found normal. Patient was prepared for emergency rigid bronchoscopy and foreign body removal. The foreign body, which was a 2 cm long metallic screw (Fig 2) was removed from the right main bronchus uneventfully. And the next day patient had creps in the right lung field, repeat chest X ray shows evidence of right lower ZMC infiltrates. Patient treated with a course of antibiotics and bronchodilators. After improvement in clinical signs and symptoms and radiological clearance patient discharged.

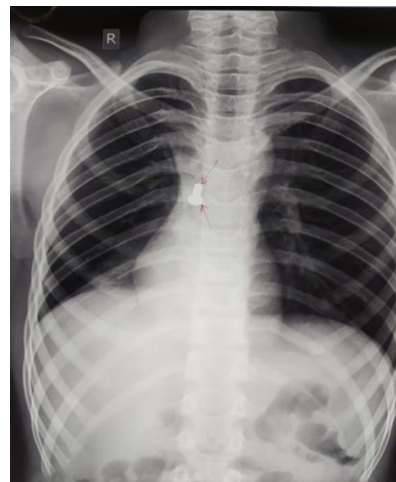


Fig 1. Chest X Ray image shows radiopaque FB in the Right main bronchus



Fig 2. Image shows FB (metallic screw) after bronchoscopic removal

Case – Two

A 20 months old male child brought to the Pediatrician, with history of paroxysmal unexplained cough for two weeks, difficulty in breathing, fever. On general examination he found that the child was febrile, dyspneic, tachypenic and respiratory system shows decreased breath sound in the left lung field associated with wheeze and there no history of witnessed foreignbody ingestion, choking episodes in the recent past. In spite of that the pediatrician suspected child may had unwitnessed airway foreign body and proceeded to radiological examination and X ray shows hyperinflated left lung field (Fig 3) , CT chest reveal a small isodense (non radio opaque) FB is detected in the left main bronchus measuring 9*8 mm the resultant ball valve mechanism affect marked hyperinflation of the entire left lung field causing compression and displacement of trachea and mediastinal vessels and heart to the right side (Fig 4), Virtual bronchoscopic image shows radiolucent FB in the left main bronchus(Fig 5). Then the pediatrician referred the child to our department, child was prepared for emergency rigid bronchoscopy and foreign body removal. After careful evaluation by the anaesthetist, after obtaining informed written high risk consent for perioperative pulmonary complication, child shifted to operating table. After well preparedness of the surgeon, staff, instruments the anaesthetist induced the child and after a minute of mask ventilation, child airway handedover to surgeon. Then the surgeon introduced 4mm ID Storz Rigid Bronchoscope in to the trachea, and Jacksons Rees circuit was connected to the side port available in the bronchoscope by anaesthetist. Then surgeon navigate the bronchoscope to left main bronchus, with aid of telescope organic foreign body vegetable seed ground nut (Fig 6) was surrounded by granulation tissue visualized in the left main bronchus, suctioning done after 5 min child start desaturating from 100% SpO₂ to 93 % , hence surgeon asked to remove the instruments from main port , which is sealed using hand and through side port controlled ventilation was maintained by anaesthetist, after improving the SpO₂ to 100% child airway handed over to surgeon. The the surgeon view

the foreignbody by telescope and the same was removed from the left main bronchus in two pieces by storz optical peanut forceps. Post operative period uneventful. Repeat CT chest taken after treated with a course of antibiotics and bronchodilators on fifth post operative day shows bilateral lung parenchyma normal, no haemothorax, no evidence of residual FB, mediastinal structures normal, which implies normal study of CT chest. After obtaining pediatrician clearance the child discharged.

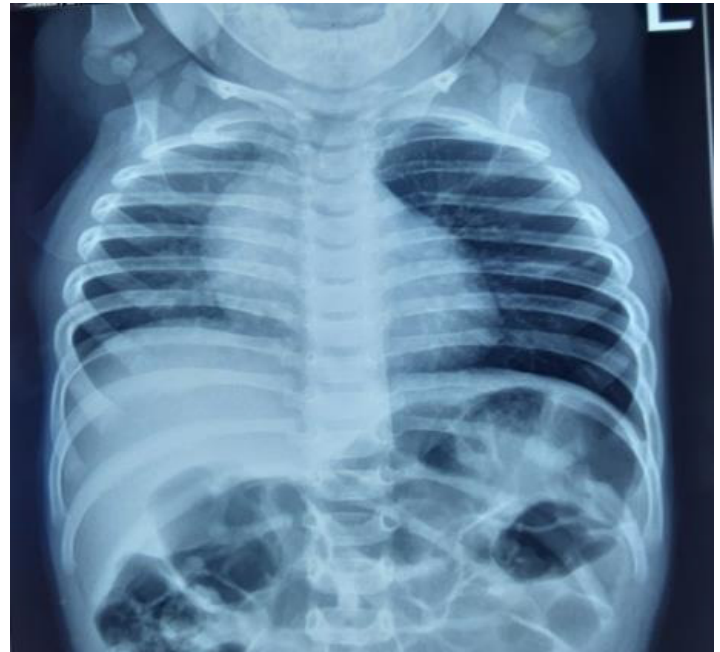


Fig 3. Chest X ray shows hyperinflated left lung due to FB

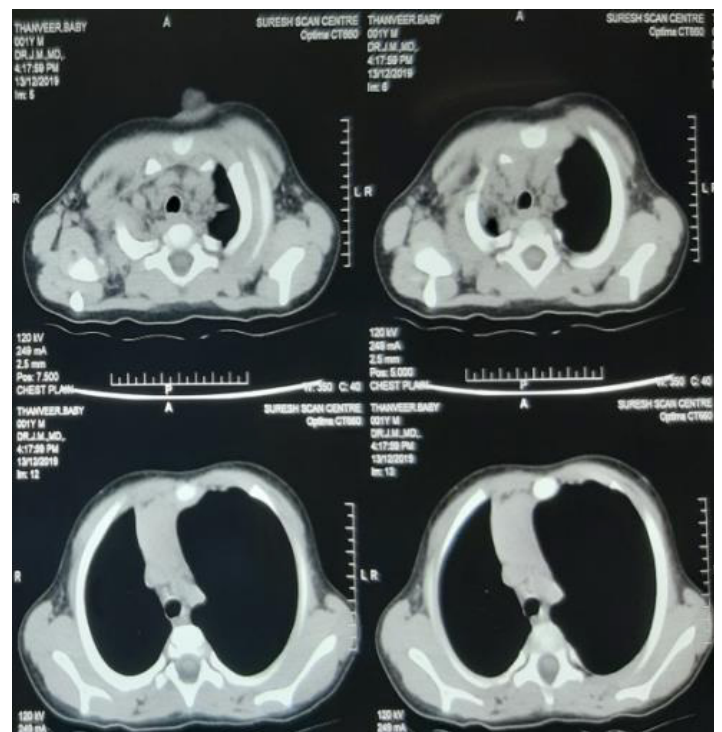


Fig 4. CT Chest shows hyperinflated left lung with trachea shift to the right side due to FB

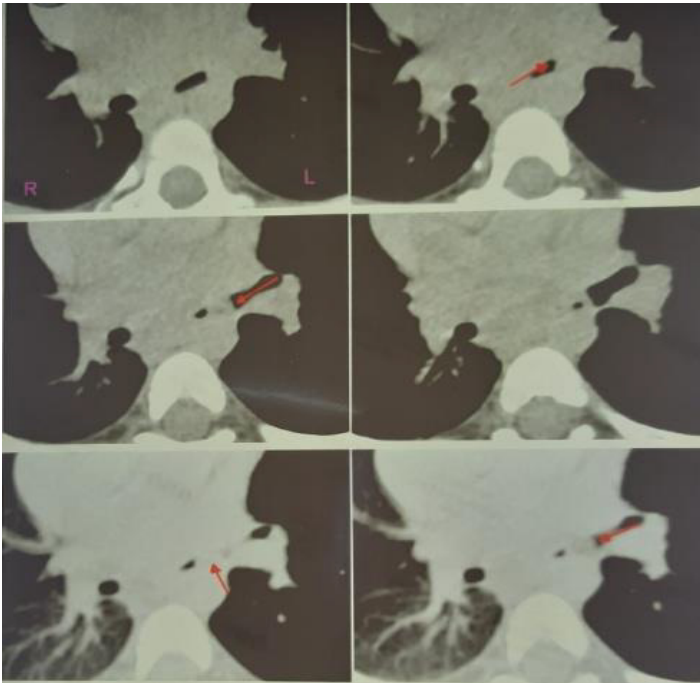


Fig 5. Virtual Bronchoscopic image shows radiolucent FB in the left main bronchus



Fig 6. Image shows organic FB (ground nut) in two pieces after bronchoscopic removal

Case – Three

A 18 months old male child brought to Pediatrician , with history of difficulty in breathing, dry cough for four days. On general examination he found that the child was afebrile, not dyspneic , not tachypneic and respiratory system shows decreased breath sound in the left lung field associated with wheeze and there is doubtful history of one episode choking while eating sugar cane in four days back. So the pediatrician suspected child may had airway

foreign body and proceeded to radiological investigation and CT chest (Fig 7) reveal subtle isodense non radio-opaque FB obliterating the distal portion of the left main bronchus with resultant hyperinflation of the left upper and lower lobes , displacing the left dome of diaphragm inferiorly , appears more translucent as compared to the right side causes mild compression and displacement of the heart and vessels to the right side with confluent alveolar infiltration in the posterior segment of the left upper lobe , extending from the hilum to pleural surface with minimal effusion in the left oblique fissure and patchy alveolar infiltrations in the posterior segment of the right lobe medially. And virtual bronchoscopic image (Fig 8) shows radiolucent FB in the left main bronchus. Then the pediatrician referred the child to our department. child was prepared for emergency rigid bronchoscopy(Fig 10). After careful evaluation by the anaesthetist , after obtaining informed written high risk consent for perioperative pulmonary complication , child shifted to operating table . After well preparedness of the surgeon , staff , instruments the anaesthetist induced the child and after a minute of mask ventilation, child airway handedover to surgeon. Then the surgeon introduced 3.5mm ID Storz Rigid Bronchoscope in to the trachea, and Jacksons Rees circuit was connected to the side port available in the bronchoscope by anaesthetist. Then surgeon navigate the bronchoscope to left main bronchus, with aid of telescope the organic foreign body piece of sugar cane (Fig 9) was visualized in the left main bronchus and the same foreign body removed by optical peanut forceps. Repeat CT chest taken after two days treated with a antibiotics and bronchodilators on second post operative day shows partial segmental collapse of the left side lingular segment with patchy pneumonia, rest of the lung field are normal, mediastinal structures are normal. Child referred to pediatrician for further managent. Where the child treated with course of antibiotics and bronchodilators. Then the child discharged without any sequelae.

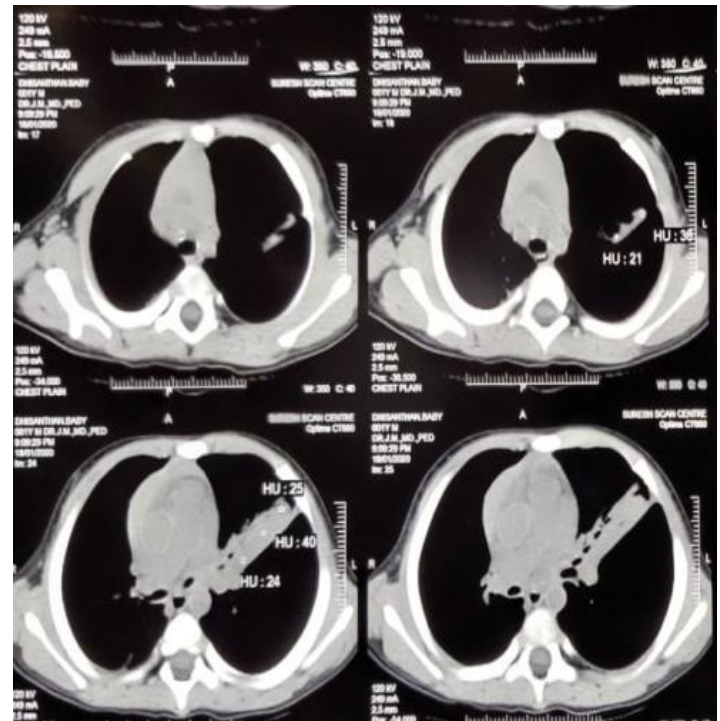


Fig 7. CT chest image shows hyper inflated left lung field and patchy infiltration due to FB

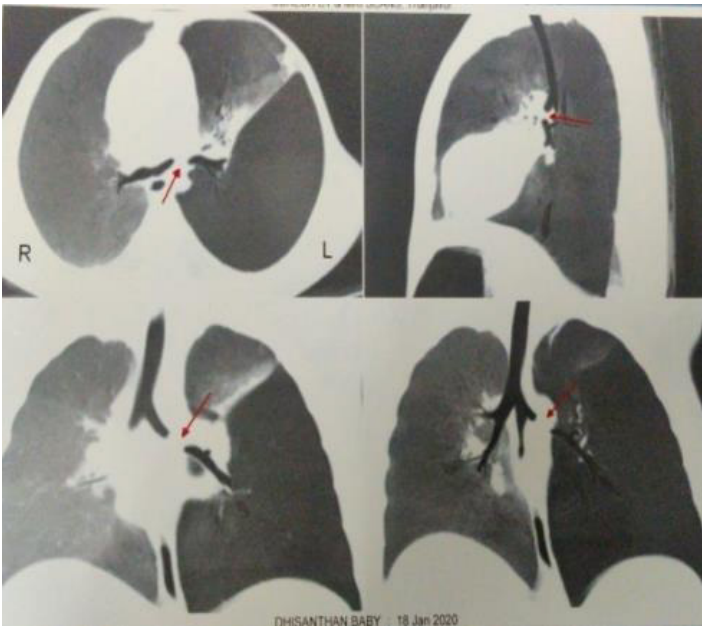


Fig 8. Virtual Bronchoscopic image shows radiolucent FB in the left main bronchus.



Fig 10. Image shows Rigid Bronchoscopy procedure , utilisation of multiple ports (light source, ventilating port, instrumentation, suction port)



Fig 9. Image shows organic foreign body after removal with rigid bronchoscope

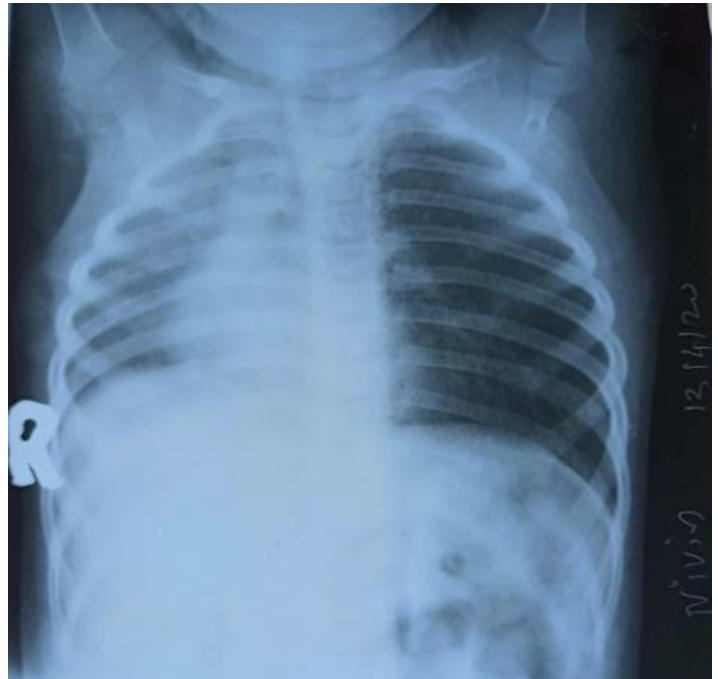


Fig 11. X Ray Chest image showing hyperinflated left lung field

Case – Four

A 2 years old male child brought by mother to Pediatrician, with history of cough and cold and fever for 4 days, difficulty in breathing for 1 day. On general examination the child was febrile , dyspneic, tachypenic , pallor and respiratory system shows bilateral air entry equal with bilateral wheeze and creps and child diagnosed as Bronchopneumonia with wheeze admitted and treated with I.V

antibiotics and bronchodilators for 1 week and then discharged. But child not completely relieved from symptoms and even worsen after a week, then again child reviewed by pediatrician. Child admitted evaluated by radiological examination Chest X ray shows hyperinflated left lung field with right lung infiltrations (Fig 12), Radiologist opinion for CT chest suggested a hyperinflated left lung with tracheal and mediastinal shift to right side ? due to mucous valvulus obstruction, then contrast enhanced CT chest taken based on that radiologist suggested the foreign body left main bronchus to be ruled out. Then the pediatrician referred the child to our department. child was prepared for Diagnostic Rigid Bronchoscopy. After careful evaluation by the anaesthetist, after obtaining informed written high risk consent for perioperative pulmonary complication, child shifted to operating table. After well preparedness of the surgeon, staff, instruments the anaesthetist induced the child and after a minute of mask ventilation, child airway handedover to surgeon. Then the surgeon introduced 3.5mm ID Storz Rigid Bronchoscope (Fig 13) in to the trachea, and Jacksons Rees circuit was connected to the side port available in the bronchoscope by anaesthetist. Then surgeon navigate the bronchoscope to left main bronchus, with aid of telescope the organic foreign body a vegetable seed ground nut (Fig 14) was visualized in the left main bronchus, and the same was removed from the left main bronchus by storz optical peanut forceps. Post operative period uneventful. Repeat CT chest taken a day after procedure which shows no increased lucency to suggest air trapping. Child treated with a course of antibiotics and bronchodilators and child discharged without any sequelae.



Fig 13. Image shows Rigid Bronchoscopy procedure

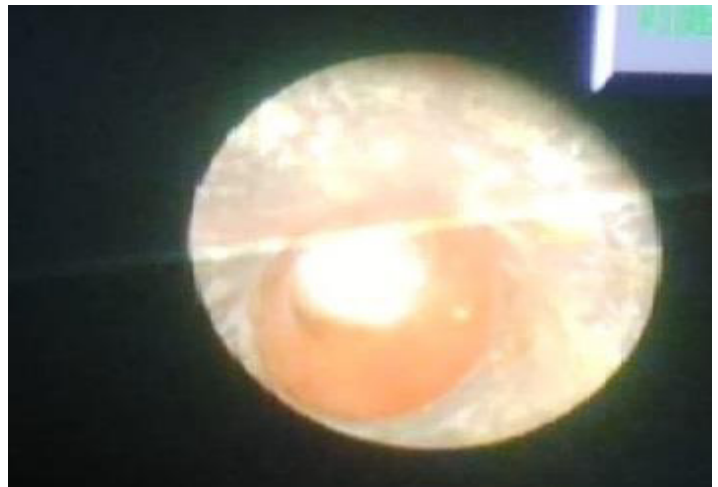


Fig 14. Image shows Telescopic view of Foreign body in the Left main bronchus



Fig 15. Image shows removed foreign body (Ground nut) with Storz Rigid Bronchoscope with Optical peanut Forceps

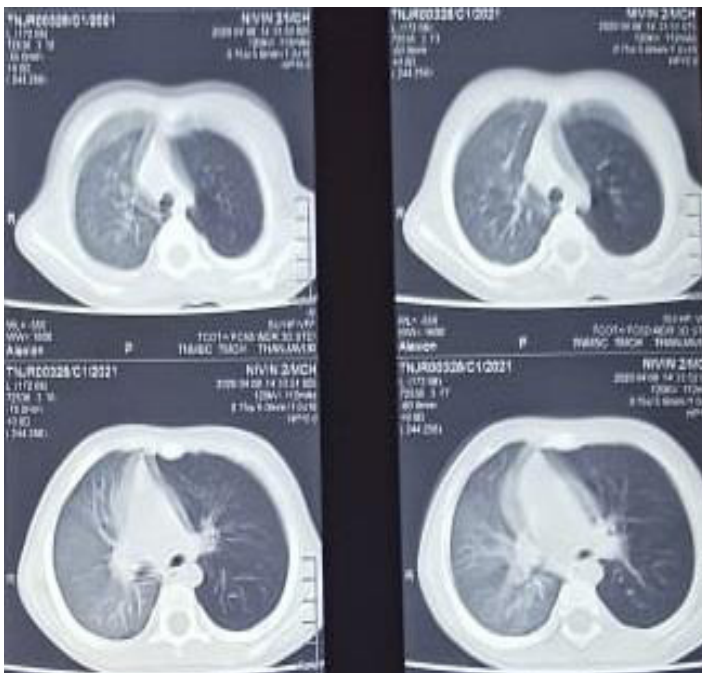


Fig 12. CT Chest image showing Hyperinflated lung in left side with tracheal shift to right side

Discussion

This study is the case series which describes various presentations and outcomes in a series of four children presented with bronchial foreign bodies. Aspiration of an FB into the trachea, and subsequently the bronchus, can occur in all age groups and most commonly occurs in infants and little children [3]. Once this occurs, identification of the FB is crucial, and hopefully occurs before bronchiectasis develops; the obstruction increases the risk of chronic infection and subsequent bronchiectasis. ie incidence of bronchiectasis due to FB aspiration is reported to be between 1% and 5.6% in the literature [4]. It should be managed effectively by complete evaluation followed by emergency bronchoscopy and FB removal.

“Few will have the greatness to bend history itself; but each of us can work to change a small portion of events, and in the total of all those acts will be written the history of this generation.”— Robert F. Kennedy. The era of bronchoscopy began with Gustav Killian in 1876 when he removed a pork bone from a farmer’s airway, using an esophagoscope. Prompted by this accomplishment, Chevalier Jackson, an American otolaryngologist, laid the platform for the modern-day rigid bronchoscope in the early twentieth century [14]. After the introduction of telescopic optic for bronchoscopy by Broyles in 1940, optical forceps in 1948 which provides excellent visualizaion and the ability to gently grasp the foreign body beyond its equator, facilitate the rapid, safe and complete removal of foreignbody. In our study we used the KARL STORZ pediatric rigid bronchoscope of appropriate sizes with compatible telescope and Optical forceps which aid the procedure safe and rapid.

The reason for the increased incidence in children is incomplete dentition, limited oro motor control and immature judgment, and also a tendency to explore the surrounding world with their hands and mouths [5]. The incidence of complications increases as more time passes between inhalation and removal of the foreign body [6]. Ingestion of foreign bodies may have unusual symptoms like unexplained fever, sore throat, cough, stridor, wheezing, anorexia, nausea, vomiting, dysphagia, and spatial chest or abdominal pain if they remain for more than seven days [8]. The patient may even be asymptomatic in up to 35% of cases of gastrointestinal foreign bodies [7]. Because many patients do not report histories of FB aspiration and do not experience typical aspiration symptoms, this disease is often missed, making diagnosis more challenging. A typical case of foreign body aspiration is a young child who has a choking accident while playing. The acute stage is defined by a cough and respiratory distress. After the foreign body becomes lodged and any reflexes have ceased to occur the patient may be asymptomatic (second phase) until complications happen (third phase) [3]. This was what happened in the second case but a troublesome cough in the third phase prompted the patient to come to the emergency department quickly and no complications arose. Missing a foreign body aspiration is not unusual like fourth case, as the first stage may not be witnessed by parents and the second stage may also be asymptomatic. The correct diagnosis will only be suspected when a careful history is taken that highlights a protracted cough and the occurrence of a choking incident. The first case reported here had acute-stage symptoms of foreign body aspiration with history of witnessed foreign body ingestion. As it is a radio opaque foreign body diagnosis and management is easy. In second and third case which were the unwitnessed , radiolucent foreign bodies, X-ray findings are not straightforward, and it was presented with more respiratory symptoms. High index of

suspicion by pediatrician made him to proceed with radiological investigation and diagnosed the foreign body bronchus earlier and referred to otolaryngologist in time for rigid bronchoscopy and FB removal. But in the fourth case there was a delay in correct diagnosis, detailed radiological evaluation, failure of high index of suspicion of airway FB by pediatrician, all lead to late referral to Otolaryngologist. This may also happen due to absence of typical symptoms at acute stage, absence of family members at the time of sudden choking, misinterpretation of clinical and radiological evaluation by physician. Bronchoscopic removal of a retained FB may be difficult because of the presence of granulation tissue and copious secretions. In our study, all four patients recovered completely after successful FB removal. It has been reported that neglected, inorganic FBs can cause permanent bronchiectasis after several years [12]. These patients sometimes require lobectomy because of recurrent infection after removal of FB. As long as the FB is diagnosed early and removed by bronchoscopy, the need for lobectomy and the risk of mortality can be reduced.

Conclusion

FB aspiration is a life-threatening clinical situation, with children <3 years of age being most commonly affected. FB aspiration must be considered a matter of emergency, especially for organic FBs. To reduce the risk of bronchiectasis secondary to FB aspiration, proper history must be obtained. In addition, CT or bronchoscopic examination should be performed for patients with long-term paroxysmal cough refractory to medical treatment, repeated occurrences of the same symptoms, recurrent or persistent consolidation in the same location in the lungs, or unexplained hemoptysis. Impaired mental status or swallowing mechanism in patients should arise suspicion of FB aspiration. Finally close supervision of pediatric population is the hallmark of prevention. Caregivers should ensure a safe surrounding milieu, including the toys their offspring play with.

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